! ''##\$%&'(\$)!*+,+-&!./!0102!

!

!"

3456\$!7#!879&\$9&-!

#"

VB. <b(. "*9"c.&*,)'(*%"v5'(*%&"<="" i="" th=""><th>\ \</th></b(.>	\ \
\$%('(+,"H&&.&&1.%'"	\\
$Q *<1+, "O * 15, +(\%' \&'" \; ; \; (\&\; 1\; (\&\&+,\&"+\%7" H55\; . \; +,\&"*9" \; ; \; (\&\; 1\; (\&\&+,\&") \;)))$	\F
Q*<1+,"0*15,+(%'&"J(@%.7"P2"O(B(,"C(@?'&"D">(',."\$E"O**<7(%+'*<	

:9-&'&+&'7946!; 46+\$-/!87<<+9'&=!''>?\$%&4&'79-/!49@!A7&'%\$!7#!A79B C'-%D'<'94&'79!

 $> ?(\&"G*,(62"5<*?(P('\&"+,,"9*<1 \&"*9"7(\&6<(1 (\%+'(*\%"*<"?+<+&&1 .\%""*\%"'? ."P+&(\&"*9"&.4"](\%6,)7(\%@"\&.4" \&'.<.*'25 .&'' &.4" 6?+<+6' .<(&'(6\&''5<.@%+\%62/"5 .<6 .(B .7"5<.@%+%62/"6?(,7P(<'?/"P<.+&'9 ..7(\@/"+\%7" <..,+'.7" 1 .7(6+,"6*\%7('(*%&'/"<.5<*7)6'(B ."?.+,'?"7 .6(&(*%:1+Z(\%@"](\%6,)7(\@"'?.")&."*9"+\%2"$

3E\$!8766\$,\$F-!8'('6!G',E&-!H!3'&6\$!: I!877D@'94&7D!!

 $>?.."0(B(,"C(@?'\&"D">(',.."\$E"0**<7(\%+'*<"6**<7(\%+'.\&"+\%7"1+\%+@.\&"'?.."0*,,..@.A\&"6*15,(+\%6.."I('?">(',..."\$E"+\%7"<..,+'.7"5<**B(\&(*%\&"*9"'?.."0,..<2"H6'"]+&"+1..%7.7"P2"-HdH^\b">?.."0(B(,"C(@?'\&"D">(',..."\BE"0**<7(\%+'*<"*B.<&..&"'?.."0*,,..@.A&"6..\%'<+,(e.7"<.&5*\%&."'*"+,,"<.5*<'&"*9"G<*?(P('.7"0*\%7)6'"'*".\%\&)<..."6*\%&(&'.\%'"(15,.1..\%'+'(*\%"*9"'?(\&"G*,(62"+\%7"6*15,(+\%6.."I('?"9.7.<+,"+\%7"&'+'...",+Ib">?..."0(B(,"C(@?'\&"D">(',..."\BE"0**<7(\%+'*<"+\%7"7..&(@\%+'.7"&'+9)"I(,,/"+1*\%@"*'?.<"'?(\@&\%")")$

- g 0*11)%(6+'." I ('?" 1.1P.<&"*9"'?." 0*,,.@."6*11)%('2"<.@+<7(%@"+55,(6+P,.",+I"+%7" 5*,(62"+%7"5<*B(7."(%9*<1+'(*%"+P*)'"<.5*<'(%@"+%7"&)55*<'"*5'(*%&b"
- g C.B(. I " +55,(6+P,." 0*,,.@." 5*,(6(.&" '*" .%&)<." (%&'(')'(*%+," 6* 15,(+%6." I ('?" +55,(6+P,." 9.7.<+,"+%7"&'+'.",+ I b"
- g T *%('*<" '?." 0*,,..@.A&" +7 1 (%(&'<+'(*%" *9" ('&" * I %" +55,(6+P,.." 5*,(6(.&/" (%6,)7(%@" <.6*<7" Z...5(%@/"+7?..<..%6."'*"'(1.9<+1.&/"+%7"*'?..<"5<*6.7)<+,"<.L)(<.1.%'&b"
- $g = 0*\%7)6'"' < +(\%(\%@"<.@+<7(\%@">(',."\$E/"<.,+'.7"5<*B(\&(*%\&"*9"'?."0,.<2"H6'"]+&"+1.\%7.7"P2" \\ H d H^/"+\%7"G<*?(P('.7"0*\%7)6'"+&"7.9(\%.7"(\%"'?(\&"G*,(62b"))) \\$

> H, .4+%7<+"Q),6?.<" H_0"C**1"!!!"]\#\^"#FY:!\\R" +9),6?.<h *42b.7)"

JD\$(\$9&'79!49@!*K4D\$9\$--!JD7,D4<-!

 $>?."0*, ..@."(\&"6*1\ 1\ (''.7"'*"'?."5<.B.\%'(*\%"*9"G<*?(P('.7"0*\%7)6'"'?<*)@?"1+\%7+'.7/"<.@),+</"+\%7"*\\ *\%@*(\%@".7)6+'(*\%"+\%7"+I+<.\%.\&\&"5<*@<+1\ \&b" $\%6*1 (\%@"\&')7.\%'\&"+\%7"\%.I".15,*2..\&"<.6.(B."5<(1+<2"5<.B.\%'(*\%"+\%7"+I+<.\%.\&\&"5<*@<+1 1 (\%@"+&"5+<'"*9"'?.(<"*<(.\%'+'(*\%"+\%7"<.')<\%(\%@"&')7.\%'&"+\%7"6)<<..\%'".15,*2..&"<.6.(B."*\%@*(\%@"'<+(\%(\%@"+\%7"<..+'.7".7)6+'(*\%b"")$

9946!937.2(9)2(6)(937.K(%)]TJETQq.24000.2412.24

F"

L%7?\$!7#!J76'%=!

 $> ?(\&"G*,(62"+55),(.\&"'*"+,,"<.5*<'\&"*9"G<*?(P('.7"0*\%7)6'"<.6.(B.7"*%"*<"+9'.<"'?.".99.6'(B."7+'."*9"'?(\&"G*,(62)"\$9"'?."+,,...@.7"G<*?(P('.7"0*\%7)6'"*66)<<.7"P.9*<."'?.".99.6'(B."7+'."*9"'?(\&"G*,(62)"+55,(6+P,..."7.9(%('(*%&"*9"1(&6*\%7)6'"(%"0*,...@."5*,(6(.&"(%".4(&'.%6."+'"'?."'(1."*9"'?."6*\%7)6'"I(,,"P.")&.7"'*"'?.".4'.%'"'?+'"'?.2"6*%9,(6'"I('?"7.9(%('(*%&"*9"'.<1&"(%"'?(&"G*,(62)">?."_<(.B+\%6."G<*6.&&.&")\%7.<"'?(&"G*,(62)"I(,,"P.")&.7"'*"(&B.&'(@+'."+\%7"<.&*,B."+,,"<.5*<'&"1+7."*<"'?+'"+<."5.%7(%@"*%"*<"+9'.<"'?."'?.".99.6'(B."7+'."*9"'?(&"G*,(62)"<.@+<7...&&"*9"I?.%"'?."'?."'?."'(%6(7.%')&^**66)<<.7b"$

>?(&"G*,(62")&.&"'?."'.<1&"6*15,+(%+%'/"<.&5*%7.%'/"'?(<7"5+<'2/"+%7" I ('%.&&"+&"9*,,* I &\""

- g <u>! "#\$%&'(&()</u>\" H%" (%7(B(7)+," I ?*" (&"<.5*<'.7" '*" ?+B." .45.<(.%6.7" 6*%7)6'" '?+'" 6*),7" 6*%&'(')'. "G<*?(P('.7"0*%7)6'/".B.%"(9"'?.2"7*"%*'"5+<'(6(5+'."(%"+%2"<.,+'.7"5<*6.&&b"
- $g = \frac{*+,\$''(-+())}{6*\%'(')'} + \frac{1}{8}(\%7(B(7)+,"I?*"?+\&"P...\%"<.5*<'.7"'*"?+B.".\%@+@.7"(\%"6*\%7)6"''?+'"6*),7"}{6*\%'(')'."G<*?(P('.7"0*\%7)6'b"}$
- g . &/)01. &/)'+,\""H"6* 15,+(\%+\%'"*<"<.&5*\%7.\%'"5+<'(6(5+'(\%@"(\%"+"<.&*,)'(*\%"5<*6.&&\)"
- $g \frac{2 \ ')(+,\cdot)}{1} \ H\%'' (\%7(B(7)+,'' \ I ?*'' \ 1+2'' ?+B.'' (\%9*<1+'(*\%''<.,\cdot B+\%''' '*'' +'' <.5*<''' *9'' G<*?(P('.7'' 0*\%7)6'b''H'' I ('%.&&" 1+2"P."+"&')7.\%'/"+\%'' . 15,*2../"*<"+"'?(<7"5+<'2b'')$

K"

g <u>3994!&#\$5,6!"(-57)</u>\"0*%7)6'"'?+'"*66)<&"*99:6+15)&"+%7"?+&"6*%'(%)(%@"+7B.<&.".99.6'&" *%/"*<"6<.+'.&"+"?*&'(,.".%B(<*%1.%'"9*</"+%2"1.1P.<"*9"'?."V66(7.%'+,"6*11)%('2"*%:6+15)&"*<"(%"+%2"0*,,..@.".15,*21.%'"*<".7)6+'(*%"5<*@<+1"*<"+6'(B('2b"

V66(7.%'+,"0*,,.@."I(,,"'+Z."<.+&*%+P,."&'.5&"'*"<.&5*%7"'*".+6?"(%6(7.%'"*9"G<*?(P('.7"0*%7)6'"(%B*,B(%@"(%7(B(7)+,&"&)Pc.6'"'*"'?."0*,.@.A&"5*,(6(.&"'?+'"*66)<"(%"6*%.6'(*%"I('?"+%2")a))))))))))

 $G+<'(.\&"\ 1+2"<.L).\&""<.+\&*\%+P,."+66*\ 1\ 1*7+'(*\%\&"\ 9*<"7(\&+P(,('(.\&""""?."\ 0)(B(,"C(@?'\&"\ D">(',."\$E"\ 0**<7(\%+'*<""+'""+\%2"\ 5*(\%'""<.,+'(\%@""*""?."\ (1\ 5,.\ 1\ .\%'+'(*\%""*9""?(\&"\ G*,(62/"\ (\%6,)\ 7(\%@"\ 1+Z(\%@""+"\ 7(\&6,*\&)<."*<'.5*<'/"+\%7"(\%('(+'(\%@"+"@<(.B+\%6."5<*6.7)<.b"H66*\ 1\ 1*7+'(*%\&"\ I\ (,,"P."@<+\%'.7"(9""?\ .2"+<."<.+&*\%+P,."+\%7"7*"\%*'"9)\%7+1\.\%'+,,2"+,'.<"'?."5<*6.7)<.&".&'+P,(&?.7"P2"'?(\&"G*,(62)"G,.+&."\%*'"+9)(<1+'(B.,2"5<*B(7)."7(\&+P(,('2"+66*\ 1\ 1*7+'(*\%"'?+'"?+B."\%*'"P..\%'\&5.6(9(6+,,2"<.L).\&'.7"P2"'?."5+<'(.\&''.B..\%" I?.<."'?."5+<'(.\&''.B..\%" I?.<."'?."5+<'(.\&''.B..\%")")$

d ('?"'?."6*%&.%'"*9"'?."(15+6'.7"&')7.%'"*<".15,*2../"'?."0(B(,"C(@?'&"D">(',."\$E"0**<7(%+'*<"I(,,"I*<Z"6*,,+P*<+'(B.,2"I('?";(&+P(,('2"J.<B(6.&"]&')7.%'&^"*<"S)1+%"C.&*)<6.&"'*".%&)<."'?+'"+55<*B.7"<.+&*%+P.."+66*11*7+'(*%&"]7(&+P(,('2:<..,+'.7^"+<."(15,.1.%'.7b"

*%4@\$<'%!PD\$\$@7<!49@!PD\$\$@7<!7#!L?\$\$%E!

JD7E'5'&\$@!879@+%&!49@!C\$#'9'&'79-!

 $\$\%"7.'.<1 \ (\%(\%@"I?.'?.<"<.5*<'.7"6*\%7) 6'"B(*,+'.\&"'?(\&"G*,(62/"'?."0*,...@."I(,,"6*\%\&(7.<"'?."'*'+,('2"*9"'?."9+6'\&"+\%7"6(<6) 1 \&'+\%6.\&"(\%B*,B.7"(\%"'?."'(\%6(7.\%'/"(\%6,)7(\%@"'?."\%+')<."*9"'?."<5*<'.7"6*\%7) 6'" +\%7"'?."'6*\%'.4'"(\%"I?(6?"('"*66)<<.7\%'\%7(B(7)+,&"*9"+\%2"&.4"*<"@.\%7.<"6+\%"6*1 1('"+\%2"*9"'?."'G<*?(P('.7"0*\%7)6'"7.9(\%.7"(\%"'?(\&"G*,(62/"+\%7"('"6+\%"*66)<"P.'I..\%"(\%7(B(7)+,&"*9"'?."\&+1."\&.4"*<"@.\%7.</"*''*\%0.<\%"*<"\%1.\%''\%1.\%'\%1.\%'\%1.\%'\%1.\%''\%1.\%''\%1.\%''\%1.\%''\%1.\%\%1.\%'\%1.\%'\%1.\%'\%1.\%'\%1.\%'\%1.\%'\%1.\%'\%1.\%'\%1.\$

! "#\$%&' (&) %*+, \$& - , . , // 0 % 1#&

 $\label{eq:control_co$

G<*?(P('.7"0*%7)6'"1..'&"'?."7.9(%('(*%"*9">(',."\$E"J.4)+,"S+<+&&1.%'"I?.%\\""

- H%"3 1 5,*2 . . "6*%7('(*%&"'? . "5<*B(&(*%"*9"+%"+(7/"+"P . % . 9('/"*<"+"& . <B(6 . "*%"+%"(%7(B(7)+, A&" 5+<'(6(5+'(*%"(%")) % I .,6* 1 . "& .4)+, "6*%7) 6'"](b . b/" : 5'-6 . / "6 : 5 ""& .4)+, "?+<+& 1 . %'^/" I ('?(%" '? . "X%(' . 7"J'+' . &i"*<"
- H"J')7.%'/"315,*2../"*<">?(<7"G+<'2".%@+@.&"(%")%I.,6*1."6*%7)6'"*%"'?."P+&(&"*9"&.4"'?+'"I*),7"P."7.'.<1(%.7"P2"+"<.+&*%+P,."5.<&*%"'*"P."&*"&.B.<./"5.<B+&(B./"+%7"*Pc.6'(B.,2" *99.%&(B."'?+'"('".99.6'(B.,2"7.%(.&"+%*'?.<"5.<&*%".L)+,"+66.&&"'*"'?."0*,,.@.A&"5<*@<+1&" *<"+6'(B('(.&/"(%"'?."X%('.7"J'+'.&i"*<""
- H" J')7.%'/" 3 15,*2../" *<" >?(<7" G+<'2" .%@+@.&" (%" J.4)+," H&&+),'/" ; * 1 .&'(6" (*,.%6./" ; +'(%@" (*,.%6./"*<"J.4)+,"+%70*<"_ .%7.<:P+&.7"J'+,Z(%@"+&"7.9(%.7"P.,* I i"+%7"
 - >?."+...@.7"6*%7)6'"I+&"5.<5.'<+'.7"+@+(%&"+"5.<&*%"(%"'?."X%('.7"J'+'.&i"+%7"
 - >?."6*%7)6'"'**Z"5,+6." I ('?(%"'?."0*,..@.A&"5<*@<+1&"+%7"+6'(B('(.&b"

 $0 * \% 7) 6'''' + Z. \&"5, +6." I ('?(\%''?."^*) 0 *, ... @. A\&"5 < *@ < +1 \&"+\%7" + 6'(B('(.\&a" I ?.\%'''? + '"6 *\%7) 6''"*66) < \& W"] !^" (\%"+", *6+'(*\%"+"+\%".B.\%'/"*<'(\%"+"6(<6) 1 \&'+\%6." I ?.<."'?."0 *, ... @.".4. < 6(\&.\&"\&) P&'+\%'(+, "6*\%' < *, "*B. <'' P*'?''?." < ... & 5*\%7. \%''+\%7"'?."6*\%'. 4'''(\%" I ?(6?"'?."6*\%7) 6''"*66) < & i"*<"] #^\"(\%"+\%2"P) (,7(\%@"* I \%.7"*<'' 6*\%'<*,... 7"P2"+\%') 7. \%'''*<@ + \%(e+'(*\%"<.6*\@%(e.7"P2"'?."0 *, ... @.\%"3B. \%'&"'?+'"*66) < "*99"6+15) &"*<'' (\%", *6+'(*\%" I ('?"\%"6*\%.6'(*\%"'*"'?."0 *, ... @."+<.") \%,(Z.,2"'*"P."6*\%.(7.<.7"+"0 *, ... @."5<*@<+1"*<"+6'(B('2\%"0 *\%7) 6''''?+'"7*. & "\%*'" 1 ... ''''?(\%"6*\%'(')''. & "G<*?(P('.7"0 *\%7) 6'''+\%"9) < '?.<"7.9(\%.7"P.,* I \%" G<*?(P('.7"0 *\%7) 6''') < ''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' 1... '''' ? ... ''' ?$

 $*9"?."0*,..@."(\%"?."X\%('.7"J'+'.\&b"8*\%:>(',.."\$E"T(\&6*\%7)6'"I(,,"9*,,*I""?."7(\&6(5,(\%+<2"<.\&*,)'(*\%"5<*6.7)<.\&"*)',(\%.7"(\%"\frac{H55.\%7(4"[b"J)6?"6*\%7)6'"(\&"7.9(\%.7"9*<"5)<5*\&.\&"*9"'?(&"5*,(62"+\&\""$

F', 7/'#'(&)'"(6"(6)I+6J&, ',6"96>+?6

i)(7"G<*"i)*"S+<+&&1.%"

 $\begin{array}{l} j \) (7"\ 5 < *"\ L) *"\ ?+< + \& \& 1\ .\%"\ *66) < \&"\ I\ ?\ .\%"\ \&*1\ .*\%."\ 9 < *1"\ *<"\ (\%"\ '?\ ."\ I\ *< Z"\ *<"\ .7)\ 6 + '(*\%+,"\ \&\ .''(\%@/"\ (\%6,)\ 7(\%@"+\%"\ .1\ 5, *2\ .\ ./"+@\ .\%'/"*<"'?\ .''5 < &*\%"+) '?*< (e\ .7"P2"'?\ ."< .6(5(\ .\%"'"*"5 < *B(7\ ."+\%"+(7/"P\ .\%\ .9('/"\ *<"\ .45,(6('\ .2"\ *<"\ (1\ 5,(6('\ .2"\ +6')\ +,\ .2/"\ +''\ .1\ 5'\&"'*"*<"5) < 5*< '\&"'*"5 < *B(7\ ."+\%7"6*\%7('(*\%"+\%"+(7/"P\ .\%\ .9('/"*<"\&\ .45,(6('\ .2"*<"(1\ 5,(6('\ .2"*+6')\ +,\ .2/"\ +'''\ .5< *@<+1"*<"+6'(B('2"*9"'?\ ."0\ *,\ ..@\ ."*\"+\"(\%7(B(7)\ +,\ A\&"5+<'(6(5+'(*\%"(\%")\)\%\ I\ .,6*1\ ."\&\ .4)\ +,"\\ 6*\%7)6'/"\ I\ ?(6?"(\%6,)7\ .\&"P)'"(\&"\%*'",(1('\ .7"'*/")\%\ I\ .,6*1\ ."\&\ .4)\ +,"+7B+\%6\ .\&''< .L)\ .\&'\&"9*<"\&\ .4)\ +,"\\ 9*B*<&/"+\%7"*'?\ .<"B\ .<P+,/"B(\&)+,/"*<"5?2&(6+,"6*\%7)6'"*9"+&\ .4)\ +,"\"+')< ./"(\%6,)7(\%@")\%7\ .<"+\%2"*9"'?\ ."\\ 9*,,*\ I\ (\%@"6*\%7('(*\%\&"")")$

g J)P1(&&(*%"'*"'?."6*%7)6'"(&".45,(6(',2"*<"(15,(6(',2"1+7."+"'.<1"*<"+"6*%7('(*%"*9"(662("2.5049-72.5049))))))

0+,(9*<%(+"J.4:

>+?5&%L?\$%"')&)'"(6

>+Z(%@"&.4)+,"+7B+%'+@."*9"+%*'?.<"5.<&*%"9*<"'?."P.%.9('"*9"+%2*%."*'?.<"'?+\"'?+\"'5.<&*\"I('?*)\"''\"+\"5.<&*\%\&"+99(<1+\('B."6*\&.\)\'/\('\)\%6,)7(\(\%\)\'P)\'"*'",(1('.7"'*/"+\\2"*9"'?."9*,,*I(\\@"+6'\&\"'')\"

- g >?."5<*&'(')'(%@"*9"+%*'?.<"5.<&*%i"
- g > ? . " ' < +99(6Z(%@"*9"+%*'?.<"5.<&*%/"7.9(%.7"+&"'?."(%7)6.1.%'"*9"+"5.<&*%"'*"5.<9*<1"+"6*11.<6(+,"&.4"+6'/"*<",+P*<"*<"&.<B(6.&/"'?<*)@?"9*<6./"9<+)7/"*<"6*.<6(*%i"
- g >?."<.6*<7(%@"*9"(1+@.&/"(%6,)7(%@"B(7.*"*<"5?*'*@<+5?/"*<"+)7(*"*9"+%*'?.<"5.<&*%A&" &.4)+,"+6'(B('2"*<"(%'(1+'."5+<'&/"I('?*)'"'?+'"5.<&*%A&"+99(<1+'(B."6*%&.%'i"
- g >?."B(. I (%@"*9"+%*'?.<"5.<&*%A&"&.4)+,"+6'(B('2"*<"(%'(1+'."5+<'&/"(%"+"5,+6." I ?.<."'?+'" *'?.<"5.<&*%" I *),7" ?+B."+"<.+&*%+P,.".45.6'+'(*%" *9" 5<(B+62/" I ('?*)'" '?+'" 5.<&*%A&" +99(<1+'(B."6*%&.%'/"9*<"'?."5)<5*&."*9"+<*)&(%@"*<"@<+'(92(%@"&.4)+,"7.&(<.b"

! "#\$%'7')06

H%2"+6""'?+""Z%*I(%@,2"+(7&/"9+6(,('+'.&/"5<*1*'.&/"*<".%6*)<+@.&"'?."6*11(&&(*%"*9"G<*?(P('.7"0*%7)6"P2"+%*'?.<"5.&%%")"

*+)&%'&)'"(6

 $>?.."0*,..@."I(,,"'+Z."(1\ 1.7(+'."+\%7"<.\&5*\%\&(B."+6'(*\%"'*"+\%2"<.5*<'"*9"<.'+,(+'(*\%"+\%7"\ I(,,"5)<\&).");\\7(\&6(5,(\%+<2"+6'(*\%"+\&"+55<*5<(+'.b"\ H\%"(\%7(B(7)+,"<.5*<'(\%@"\ G<*?(P('.7"\ 0*\%7)6'"\ (\&"\ .\%'',.7"\ '*"5<*'.6'(*\%"9<*1"+\%2"9*<1"*9"<.'+,(+'(*\%"9*,,*\ I(\%@"+"<.5*<'"'?+'"(\&"\ 1+7."(\%"@**7"9+('?/"\ .B.\%"(9"'?."<.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'"',.5*<'",.5*<'"',.5*<'",.5*<'"',.5*<'",.5*<'"',.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<'",.5*<$

8.39":"#%7&; %\$,#"31/9"</&

./"I'C')+-6*+%&)'"(,I'\$,6M')I6>)5-+(),6

 $3B.\%''(9"+\%".15,*2..."*9"'?."0*,,.@."].46,)7(\%@"\&')7.\%'".15,*2..\&^"7*.\&"\%*"?*,7"+"5*\&('(*\%"*9"+)'?*<('2"*B.<"+\&')7.\%''+\&2"&.4)+,"*<"<*1+\&'(6"<..,+'(*\&?(5"P.'I...\&"+\%".15,*2..."+\%7"+\%".7.\%""*9"'?."0*,,.@."6*),7"c.*5+<7(e."'?."(\%'.@<('2"*9"'?."+6+7.1(6"+\%7",(B(\@".\%B(\%"1.\%"*9"'?."V66(7.\%'+,"6*11)\%('2"+\%7"7+1+\@."'?."\&')7.\%'\b">?.<.9*<./"\&.4)+,"*<"<*1+\%'(6"<..,+'(*\&?(5\%"P.'I...\&"+\%"1.15,*2..."+\%7"7+1+\@."'?."\&')7.\%'\b">?.<.9*<./"\&.4)+,"*<"<*1+\%'(6"<..,+'(*\&?(5\%"P.'I...\&"+\%"+\%"'?."\&')7.\%'\b")>?.<.9*<./"\&.4)+,"*<"<*1+\%'(6"<..,+'(*\&?(5\%"P.'I...\&"+\%"+\%"'?."\&')7.\%'\b")>?.<.9*<./"\&.4)+,"*<"<*1+\%'(6"<..,+'(*\&?(5\%"P.'I...\&"+\%"+\%"'?."\&')7.\%'\b")>?.<.9*<./"\&.4)+,"*<"<*1+\%'(6"<...+'(*\&?(5\%"P.'I...\&"+\%"')"?.\&?(5\%"P.'I...\&"+\%"')*("\&.4)+,"*<"<*1+\%'(6"<...+'(*\&?(5\%"P.'I...\&"+\%"')"?.\B(\%")"?.\B(\%"")*("\%"+\%"+\%")"?.\B(\%"")*("\%"+\%"+\%")"?.\B(\%"")*("\%"+\%"+\%"")*("\%"+\%"+\%"")*("\%"+\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%"+\%"")*("\%")*("\%"\%"+\%"")*("\%"")*("\%"\%"+\%"")*("\%"")*("\%"\%"+\%"")*("\%"")*("\%"\%"")*("\%"\%"")*("\%"\%"")*("\%"\%"")*("\%"\%"")*("\%"\%"")*("\%"\%"")*("\%"")*("\%"\%"")*("\%"")*("\%"")*("\%"")*("\%"\%"")*("\%"")*("\%"\%"")*("\%"$

L?7+\$)'''(,6

346.5'(*%&"*""?.&."5<*?(P('(*%&"I(,,"P."6*%&(7.<.7"*%"+"6+&.:P2:

- g <u>O/++%06&(-6&7)'A+%068'A+(\)</u>"0*%&.%'"6+%%*'"P."*P'+(%.7"'?<*)@?"'?.")&."*9"9*<6./"6*.<6(*%/"'?<.+'&/"(%'(1(7+'(*%"*<"5<.&&)<(%@/"*<"P2"'+Z(%@"+7B+%'+@."*9"'?."(%6+5+6('+'(*%"*9"+%*'?.<"(%7(B(7)+,b"

- $g \frac{K'')65(\%'\#') + -N}{0} 0 \% \& .\%''' * \% ." 9 < 1 " * 9 " & .4) + ," 6 * \% ' + 6'' 7 * . \&" \% * " 6 * \% & '(')' ." 6 * \% & . \%''' * " + ,," 9 * < 1 &" * 9 " & .4) + ," 6 * \% ' + 6' /" % * < " 7 * . &" 6 * % & . \''' * " & .4) + ," + 6' (B('2" I ('?" * \) ." 5 . < & * \% b" 3 + 6?" 5 + < '(6(5 + \) " (\\" " " + \) & .4) + ," . \% 6 *) \\ ' . <" 1) & '" 6 * \% & . \\"'' \\ 6 * \% & . \\"'' \\ 6 * \% & . \\"'' \\ 6 * \% & . \\"'' \\ 6 *$

<u>O"/7+</u>6

879#'@\$9&'46'&=/!JD'(4%=/!49@!G\$64&\$@!G\$?7D&'9,!G\$-?79-'5'6'&'\$-!

#### 8."C,6@&,17&B31>"7%1#",\$"#@D&E17%./#,17"1F	%&=">>%.%16%/&

 $> ?."0*, ...@."(\&"6*1~1 (''.7"'*"5<*'.6'(\%@"'?."5<(B+62"*9"+,,"(\%7(B(7)+,\&"(\%B*,B.7"(\%"'?."(\%B.\&'(@+'(*\%"+\%7"<.\&*,)'(*\"*9"<.5*<'\&")\%7.<"'?(\&"G*,(62b">?."0*,,..@."+,&*"(\&"6*1~1 (''.7"'*"+&&(&'(\%@"&')7.\%'\%'').15,*2...&/"+\%7"'?(<7"5+<'(.\&"(\%"1+Z(\\@"(\%9*<1.7"6?*(6.\&b"~d~('?"<.\&5.6'"'*"+\%2"<.5*<'")\%7.<"'?(\&"G*,(62/"'?."0*,,..@."~1 (,,"~1+Z."<.+&*\%+P,...99*<'\&"'*"5<*'.6'"'?.."5<(B+62"*9"5+<'(6.5+\%'\&/"(\%"+66*<7+\%6."~1 ('?"+55,(6+P,...&'+'."+\%7"9.7.<+,",+~1/"~1 ?(,..."P+,+\%6(\\@"'?...\%...7"'*"\@+'?..."(\\99*<1+'(\%"+1)*"'+Z...\&'.5\&"'*".,(1 (\%+'..."G<*?(P('...7"0*\%7)6')'5<.B.\%''('\&"<.6)<...\%6.\%6.\%+\%7"<.1.72"('\&".99.6'\&"H,,"0*,...@.\%1.5\,\%2...\&"1 ?*"+<...\%8*,B.7"(\%"'?...0*,...@.\&\%8*,B.7"(\%"'?...0*,...@.\&\%8*,B.7"(\%"'?...\%1)*E'<.\&5*\\&...\&.6.(B...\&5.6(9(6"(\%\&'<)6')*\%"$

 $*<"<.\&5*\%7.\%""*"?."@.\%.<+,"5)P,(6"I('?*)'".45<.\&\&"I<(''.\%"6*\%\&.\%'"*<"+P\&.\%'"+\%*'?.<".46.5'(*\%"6*\%\&(\&'.\%'"I('?"'?.",+Ib">?."<.,.+&."*9"\%+1.\&"I(,,"P."@)(7.7"P2"+55,(6+P,.",+I/"(\%6,)7(\%@"'?."Q+1(,2"37)6+'(*\%+,"C(@?'\&"+\%7"G<(B+62"H6'"]Q3CGH^"+\%7"'?."0,.<2"H6'b"\%"+\%"+77('(*\%/"\%*"(\%9*<1+'(*\%"I(,,"P."<.,.+&.7"9<*1"+"5<*6..7(\%@"'*".\%9*<6."'?(\&"G*,(62".46.5""+\&"<.L)(<.7"*<"5.<1(''.7"P2",+I"+\%7"0*,..@."5*,(62b"$

! "(9'-+()'&\%')06

 $\begin{array}{l} {}^{\circ}0\%9(7.\%'(+,('2a"@.\%.<+,,2"1.+\%\&"'?+'"(\%)^{\ast}<1+'(*\%"\&?+<.7"P2"+\%"(\%7(B(7)+,"I('?"7.\&(@\%+'.7"6+15)\&"*<'6*11)\%('2"5<*9.\&\&(*\%+,\&"6+\%*'"P."<.B.+,.7"'*"+\%2"*'?.<"(\%7(B(7)+,"I('?*)'"'?.".45<.\&\&"5.<1(\&\&(*\%"*9"'?."(\%7(B(7)+,\")>?."6*\%9(7.\%'(+,('2"*9"(\%)^{\ast}<1+'(*\%"\&?+<.7"P2"+\%"(\%7(B(7)+,"I('?"7.\&(@\%+'.7"6+15)\&"*<'6*11)\%('2"5<*9.\&\&(*\%+,\&"@.\%.<+,,2"(\&"@*B.<%.7"P2"0+,(9*<\((+",+I/"(\%6,)7(\%@"0+,(9*<\((+",+I/"(\%6,)7))^{*}))^{*}<1+'(*\%"P2"1.\%'+,"?.+,'?"5<*B(7.<\&''*(*7+(\%.7"6,.<@2/"<+5."6<(&(&"6*)\%&.,*<&/"+\%7"+''*<\%.2\&'"+,,"*9"I?*1"?+B.",.@+,,2"5<*'.6'.7"$

!/'#+6Q''86

G\$?7D&'9,!Q?&'79-!

 $\begin{array}{l} H,, "6*\ 1\ 5, +(\%'\&"*9"B(*, +'(*\%\&"*9"'?(\&"G*, (62"\ I\ (,, "P."'+Z.\%"\&.<(*)\&.2"+\%7"(\%"@**7"9+('?b">?."\ O\ (B(, "C(@?'\&"D">(',. "$E"\ 0**<7(\%+'*<"\ I\ (,, "5<*B(7."(\%9*<1+'(*\%"+\%7"@)(7+\%6."<.@+<7(\%@"?*\ I"'*"9(,."+")))))) \end{array}$

I('?",+I".%9*<6.1.%'/"+%7"(%9*<1+'(*%"+P*)'"*%:"+%7"*99:6+15)&"<.&*)<6.&"+%7"*5'(*%&"9*<"<.&*,)'(*%b"

QE. F6RQ'', 6E(8+%+,6."%'7+6F+\$&/)#+()S6

HB+(,+P,."'*"<.&5*%7"'*"+%2"<.5*<'&"*9"6<(1."*<"B(*,.%6./"(%6,)7(%@"G<*?(P('.7"0*%7)6'b"Q*<"31.<@.%6(.&"Y!!"

 $Q^*<"6^*\%6.<\%(\%@"\&(')+'(*\%\&/"6+,,"7(\&5+'6?"+'"]RMM^"HJU:nHG;"r]RMM^:\#MF:F\#M\sb"$

$QE \cdot F6K''/)I+\&, 06F'A', '''(6)$

 $\begin{array}{l} 0<&(1\ (\%+,"(\%B.\&'(@+'(*\%\&"\ 1+2"P.")\&.9),"(\%''?."@+'?.<(\%@"*9"<..,B+\%'''.B(7.\%6./"5+<'(6),+<,2"9*<..\&\&(6").B(7.\%6.b">?..&'+\%7+<7\&"9*<"9(\%7(\%@"+"B(*,+'(*\%"*9"6<(1\ (\%+,",+\ I"+<."7(99.<..\%''9<*\ 1"'?."&'+\%7+<7\&"9*<"9(\%7(\%@"+"B(*,+'(*\%"*9"'?(\&"G*,(62b"0*\%7)6'"\ 1+2"6*%&'(')'."G<*?(P('.7"0*\%7)6'")\%7.<"'?(\&"G*,(62"0.8",62"0.8")) \\ & .B.\%''(9",+\ I".\%9*<6.1.\%''+@.\%6(.\&",+6Z"\&)99(6(.\%'''.B(7.\%6."*9"+"6<(1."+\%7"7.6,(\%."'*"5<*&.6)'.b"") \\ & .B.\%''(9",+\ I".\%9*<6.1.\%''+@.\%6(.\&",+6Z"&)99(6(.\%'''.B(7.\%6."*9"+"6<(1."+\%7"7.6,(\%."'*"5<*&.6)'.b"") \\ & .B.\%''(9",+\ I".\%9",+\ I".\%9$

H 0"C**1"!!!"

I I I b*42b.7)06(B(,:<(@?'&:'(',.:(4"

]\#\^"#FY:!\\R"

! & #\$5,6>&9+)06

$$\begin{split} HB+(,+P,."+\&"+"9(&\&"*5'(*\%""*"<.5*<""+\%2"(\%6(7.\%""*9"6<(1."*<"B(*,.\%6./"+\&"I.,,"+\&"+\%2"(\%6(7.\%"*9"6<(1."*<"B(*,.\%6./"+\&"I.,,"+&"+\%2"(\%6(7.\%"*9"6<(1."*<"B(*,.\%6./"+\&"I.,,"+&"+\%2"(\%6(7.\%"*9"6+\%"0.**)). \\ (\%6(7.\%'\&"(\%B*,B(\%@"G<*?(P('.7"0*\%7)6'b"H,\&*"5<*B(7.\&"+\%".\&6*<'"\&.<B(6."*\%"6+15)\&"'*+\%2"&**+\%2" \\ \&')7.\%'"+\%7"6+\%''<.+6?"'?."; .+\%"*\%";)'2"+'"+\%2"'(1.b"HB+(,+P,."#="?*)<\&"+"7+2/"M"7+2&"+" \\ I...Zb"0+15)\&"J+9.'2"I(,,"9*<I+<7"+\%2"<.5*<'&"(\%B*,B(\%@"5*'.\%'(+,"G<*?(P('.7"0*\%7)6'"'*"'')). \\ '?."0(B(,"C(@?'\&"+\%7">(',."$E"V9)66.b"). \\ \end{split}$$

- Q+6(,('(.&"T+%+@.1.%'"[)(,7(%@"
 - <u>I I I b*42b.7)0*99(6.&:&.⟨B(6.&06+15)&:&+9.'2"</u>

1\#\^"#FY:#FYY"19<*%'"7.&Z^"

@5#&(6*+,"5/7+,6)

$$\begin{split} HB+(,+P,." *\%" & I ... Z7+2\&" ~7)<(\%@"<.@)~,+<" *99(6." ?*)<\&" '*" <.6.(B." 6* 15,+(\%'\&"<.,+'.7" '*" .15,*2...&"*9"'?." 0*,,.@./"(%6,) 7(%@"9+6),'2b"S) 1+%"C.&*)<6.\&" I (,,"9*< I +<7"+%2"<.5*<'&" (%B*,B(%@"5*'.%'(+,"G<*?(P('.7"0*%7)6'"'*"'?."0(B(,"C(@?'&"+%7">(',."$E"V99(6.b" H 0"O(<&'"0,**<"$$

I I I b*42b.7)0*99(6.&:&.<B(6.&0?) 1 +%:<.&*)<6.&"

1\#\^"#FY:#K!\"

F + & (6''96 >) 5 - + (), 6399'7 + 1F + & (6''(6F5)06)

$$\begin{split} HB+(,+P,."*\%"\ I\ .\ .Z7+2\&"7)<&(\%@"<.@)\ ,+<"*99(6."?*)<\&b"\ H66.\&\&"'*"\ ;\ .+\%"*\%"\ ;\)'2"\#="?*)<\&"+"\\ 7+2"\ P2"\ 6+,,(\%@"\ 0+15)\&"\ J+9.'2"\ +'"\]\backslash\#/^"\ \#FY:\#FYYb"\ 0+\%"\ +\&\&(\&''\ I\ ('?"<.+\&*\%+P,."\\ +66*\ 1\ 1*7+'(*\%\&"9*<"?*)\&(\%@/"+6+7.\ 1\ (6"9,.4(P(,('2/"+\%7"\ 8*"0*\%'+6'"n.''.<\&b">?."\ ;\ .+\%"*9"\ J')7.\%'\&"\ I\ (,,"9*<I+<7"+%2"<.5*<'\&"(\%B*,B(%@"5*'.\%'(+,"G<*?(P('.7"\ 0*\%7)6'"'*"'?."\ 0(B(,"C(@?'\&"+\%7">(',."$E"V99(6.b") [..<Z)\&"S+,,"]])])]$$

; %<3.#"1F&H*#%.1,\$&KF%16"%/&

; ')%+6<=6! "#\$%'&(7+6

\$%L)(<(.&"*<"6* 15,+(%'&"6*%6.<%(%@"'?."0*,,.@.A&"6* 15,(+%6."I('?">(',."\$E"1+2"P."<.9.<<.7"'"'?."XbJb"; .5+<'1.%'"*9"37)6+'(*%A&"V99(6."9*<"0(B(,"C(@?'&b"

XbJb"; .5+<'1.%'"*9"37)6+'(*%"V99(6."9*<"0(B(,"C(@?'&/"J+%"Q<+%6(&6*""

X%('.7"8+'(*%&"G,+e+/"J)('."FN"

J + %"Q < + %6(&6*/"O + (9*<%(+"Y = !N#""

]=!F^"=RK:FFFF""

I I I#b.7b@*B0+P*)'0*99(6.&0,(&'0*6<0(%7.4b?'1,"

L # %''0# + ()6F', 7/'#'(&)'''(6''/6@&/&, #+()6

 $H\%2".\ 15,*2..."\ 1+2"5)<\&)\ ."+\%2"6?+<@.."*9"7(\&6<(\ 1(\%+'(*\%"*<"?+<+&\&\ 1.\%"\ I\ ('?"'?."0+,(9*<\%(+"3.5+<'1.\%""*9"Q+(<"3.15,*2.1.\%""+\%7"S*)&(\%@"]`;\ Q3Sa^{``*<"'?}."9.7.<+,"3L)+,"V55*<')\%('2"3.15,*2.1.\%""0*1.1(&&(*\%"]`33V0a^{``$}"(\&")\%,+I9),"'*"<.'+,(+'."+@+(%&'"+%2".15,*2..."9*<"*55*&(%@"'?."5<+6'(6.&"5<*?(P('.7"P2"'?."0+,(9*<\%(+"Q+(<"3.15,*2.1.\%""+%7"S*)&(%@"H6'"*<"6*15+<+P,."9.7.<+,",+I"*<"9*<"9(,(%@"+"6*15,+(%'"I('?/"*<"9*<""'?.*<I(&."5+<'(6(5+'(%@"(%"+\"""+\""")))))))))))))))))$

 $H\%2". 15,*2.."1+2"5) < \&)."+\%2"6?+<@."*9"7(&6<(1(%+'(*%"*<"?+<+&&1.%'"I('?"'?."0+,(9*<\%(+"3.5+<'1.%'"*9"Q+(<"3.15,*2.1.%'"+%7"S*)&(%@"]`;Q3Sa^b"$

0+,(9*<%(+";.5+<'1.%'"*9"0+(<"315,*21.%'"+%7"S*)&(%@"

\#N" d .&'"='?"J'<...'"

n*&"H%@...&/"O+,(9*<%(+"YNN!)"

]#!\^"=\Y:KMYY""

 $>?."[\)<.+)"9*<"G<(B+'."G*\&'\&.6*\%7+<2"37)6+'(*\%"+66.5'\&"+,,"'25.\&"*9"6*15,+(%'&"<.,+'.7"'*"'?."0*,,.@."+\%7"1+2"<.9.<"+\%2"6*15,+(%'"('"<.6.(B.\&"(\%6,)7(\%@"6*15,+(%'&"<.,+'.7"'*"'(%\&'(')'(*\%+,"5*,(6(.\&"*<"5<*6.7)<.\&/"*<"P*'?/"'*"'?."0*,,.@./"+%"+66<.7('(\%@"+@.\%62/"*<"+\%*'?.<"+55<*5<(+'.".\%'('2"9*<"<.&*,)'(*\%b""$

 $\begin{tabular}{ll} [\ \)<.+ \)"9*<"G<(B+'."G*\&'\&.6*\%7+<2"37)6+'(*\%"" \\ \#F\F"0+5('*,"V+Z\&";<(B./"J)('."=NN"" \\ J+6<+1.\%'*/"0H"YFR\\" \\]Y!K^"=\ !:KY\#="" \\ I I I bP55.b6+b@*B" \end{tabular}$

A#9%.&; %<3.#"1F&B31/"7%.,#"31/&

;'#+%'(+,,6&(-6Q''7&)'''(6''96<(7'-+()6)

 $0*15, +(\%+\%'\&''+\%7'')?(<7:5+<'2"\ I\ ('\%.\&\&.\&''+<.".\%6*)<+@.7"'*"<.5*<'"G<*?(P('.7"0*\%7)6''+\&''\&**\%''+\&''')<0*,...@.A\&''+P(,('2"'*"<.\&5*\%7"5<*15',2"+\%7".99.6'(B.,2b">>?." 0*,...@.A\&''+P(,('2"'*"<.\&5*\%7"5<*15',2"+\%7".99.6'(B.,2b">>?." 0*,...@.7*.\&''\%*''/?*\ I.B.</'',(1('''?."'(1."9<+1."9<+1."9*<"<.5*<'(\%@b"$9"'?."<.&5*\%7.\%'''(\&''\%"+"+"1.1P.<"*9"'?."V66(7.\%'+,"6*11)\%'('2'''?."0*,...@."I(,,\%'(,,\%.Z"'*"+Z.\%'.5\%"*".\%7"'?."?+<+&&1.\%'/"5<.B.\%''' ('\&"<.6)<<.\%6./"+\%7"+77<.&&" ('\&".99.6'\&/"P)'' ('\&"+P(,('2"'*"'+Z."7(\&6(5,(\%+<2"+6'(*\%"+@+(\%\&'''?."<*\%5*\%7.\%'''1+2/"\%9"6*)<\&./"P.",(1('.7b"H\%'(\%6(7.\%''7*.\&'\%*''"?+B."'*"66)<"\%"6+15)\&"'*"P."<.5*<'.7" '*"'?."0*,...@.b"''$

E#(+,)069''/6E%7''I''%6''/63)I+/6F/586U,+6''/63)I+/6!''(-57)6G'''%&)'''(,6)

$\&) < B(B^* < +7B^*6 + '. h^*42b.7)$ ""

]\#\^"#FY:!\FY"

399'7+69"/6*+%'8'"5,6T6>\$'/')5&%6Q'9+6

G<*B(7.&"&5(<(')+,"@)(7+%6."+%7"(%"'?."6*%'.4'"*9"*<7+(%.7"6,.<@2/"6*%9(7.%'(+,"&)55*<'b") S.<<(6Z"\$%'.<9+('?"0.%'.<"

I I I b*42b.7)0&')7.%':,(9.0<.&*)<6.&:&)55*<'0*<&,"

]\#\^"#FY:#K#!"

L#\$%"0++6E,,',)&(7+6./"8/

 $V66(7.\%'+,"0*,,.@. \&\&"315,*2..."H\&\&(\&'+\%6."G<*@<+1"]3HG^"(\&"7.\&(@\%.7"'*"?.,5"1+4(1(e.".15,*2...\&A"?.+,'?"+\%7".99.6'(B.\%.\&\&"+'"?*1."+\%7"+'"I*<Zb"H71(%(&'.<.7"P2">?.."J'+\%7+<7"'?.."3HG"*99.<&".15,*2...&"6*\%9(7.\%'(+,/"5.<&*\%+,"&)55*<'"9*<"+"I(7."<+\%@."*9"(&&).&/"9<*1" .B.<27+2"6*\%6.<\&"'*"&.<(*)&"5<*P,.1&b">?.."315,*2..."H&&(&'+\%6."G<*@<+1"(&"+B+(,+P,."'*" .15,*2...&"+\%7"'?.(<"9+1(,2"1.1P.<&"+'"\%*"6*&'b"$

I I I b?.+,'?+7B*6+'.b6* 1 0&'+%7+<7\"

 $]RRR^"#Y : KY=R"$

L##"(,6>)5-+()62+%(+,,6!+()+/V66

I I I b<+(%%b*<@"

]RNN^"KFK:=KM\"

<u>K&)'"(&%F"#+,)'76G'"%+(7+6@")%'(+6</u>

$$\begin{split} HB+(,+P,." \#=&0M" \ '*" \&5.+Z" \ 6*\%9(7.\%'(+,,2" \ I \ ('?" +\%2*\%." \ .45.<&(.\%6(\%@" \ 7*1 \ .\&'(6" \ B(*,.\%6./" \& ..Z(\%@"<.\&^*)<6.\&"*<"(\%9*<1+'(*\%/"*<"L) .\&'(*\%(\%@")\%?.+,'?2"+\&5.6'&"*9"'?.(<"<.,+'(*%&?(5b")))] ... \end{split}$$

QE6! "5()01U > !6P + - '7&% ! + () + /6

 $G<*B(7.\&" \ 1.7(6+," \ '<.+' \ 1.\%'" \ +\%7" \ 9*<.\&\&(6" \ .4+1\&" \ 5.<9*<1 \ .7" \ P2" \ J.4)+," \ H\&\&+),'" \ 8)<\&." \ 34+1(\%.<\&b"n*\&"H%@.,.\&"0*)%'2"7.\&(@%+'.7"JHC>"0.%'.&" \ HN!N"u*%+,"HB.b"" \ n*\&"H%@.,.\&/"0+,(9*<%(+"YNN\\"" \]\#\^"##K:\YK!"$

*&\$+6;/+&)#+()6!+()+/6&)6>&()&6P"('7&4U!OE6P+-'7&%!+()+/6

G<*B(7.&"9<..."'<.+'1.%'"9*<"&.4)+,"+&&+),"'&)<B(B*<&'"(%6,)7(%@"#=:"?*)<".1.<@..%62"1.7(6+,"6+<.."+%7"9*<...&(6".4+1&"5.<9*<1.7"P2"J.4)+,"H&&+),'"8)<&."34+1(%.<&'"6*)%&..(%@"+%7"5&26?*'?.<+52/"+7B*6+62/"+%7"+66*15+%(1.%'"&.<B(6.&b"n*&"H%@.,.&"0*)%'2"7.&(@%+'.7"JHC>"0.%'.&b"!#FN"J(4'...%'?"J'<...'"

J+%'+"T*%(6+/"O+,(9*<%(+"YN=N=""]=#=^"#FY:M#NR"]#=:?*)<"?*',(%.^"

K77"#"31, %A14B, 0 < +/&S&A>>4B, 0 < +/&; %/3+.6%/&

./"D+7)6>EOL6R>+.25%6E, , &5%6O/++6L(A'/"(#+()S6)

H%" *%:6+15)&" 5<.B.%'(*%" +%7".7)6+'(*%" &)55*<'" 5<*@<+1 " 7.7(6+'.7" '*".%7(%@" &.4)+," B(*,.%6."*%"6+15)&"'?<*)@?"<.&*)<6.&/"+7B*6+62/"+%7".7)6+'(*%+,"5<*@<+1 1 (%@b" J'.I+<':

Q'', 6E(8+%+, 6QZJ; 6!+()+/6

 $\begin{array}{l} G<^*B(7.\&^n\&)\,55^*<'''+\%7''+7B^*6+62''\&.<B(6.\&^n9^*<''n_[>^n6^*1\ 1\)\%('2''1\ .\ 1\ P.<\&b'''\\ !\,K\#F''\,8\,b''\,J\,6?<+7\ .<''[\ ,B7b'''\\ n^*\&''H\%@.\,,.\&'''0+,(9^*<\%(+"YNN\#R''),+,@P'6.\%'\,.<b*<@'''\\]\,V\#\^nYY\ :M=NN''' \end{array}$

! &\"9"/('&62"#+([,6Q&M6!+()+/6R!2Q!S6

 $>?.."0 \ dn 0"?+\&"+''*<\%.2\&"+B+(,+P,."'*"\&.4B."+\&"+"<.\&*)<6.0+7B(\&*<"'*"V66(7.\%'+,"0*,...@."6*15,+(\%+\%'\%'')(\%6,)7(\%@"P*'?"1.\%"+\%7"I*1.\%'"I?*"+<."9(,(\%@">(',."$E"\&.4)+,"+&\&+),'/"?+<&\&1.\%'\"*<"@.\%7.<"7(\&6<(1(\%+'(*\%"6*15,+(\%'\&"+\%7"@*(\%@"'?<*)@?"'?."V66(7.\%'+,"0*,...@."<.\&*,)'(*\%"5<*6.\&\%"tG,.+\&.\\%*'./"?*I.B.</"'?+'"'?."0*,...@.\"7*.\&\\%*''.\\%7*<\&.**<".\&"**<".6\&\%"+\%"[**-(\%"]*<"'.(\%"+\%7"?*+\%7"'?+'"'?."*<\@+\\%(e+'(*\%"1+Z.\&"+\%"(\%7.5.\%7.\\%""7.6(\&(*\%"+P*)'"'?.\"6+\&.\&"'?+'"("I(,,"+66.5'"+\%7"'?."'.<1\&"\%"?"?.\"6+\&.\&\\"+'(*\\%\)"\\KN"8*<'?"G+6(9(6"0*+\&'"S(@?I+2/"J)('."#NMN/"3,"J.@)\%7*/"0H"YN#=F"?"''5\&\\%1.5\&\%1.5\&\%1.6\&\\%"\)$

1\#\^"YF!:!N=!"

Q(\$D('\$K!7#!G\$-76+&'79!Q?&'79-!

>?.."5<*6.&&.&")%7.<""?(&"G*,(62"+<."&.5+<+'."+%7"7(&'(%6'"9<*1"0+,(9*<%(+A&"6<(1(%+,"5<*6.7)<.&b")))) <*6...7(%@&")%7.<""?(&"G*,(62"1+2"P."6+<<(.7"*)'"5<(*<"'*/"&(1),'+%.*)&.2"I('?/"*<"9*,,*I(%@"6(B(,"*<"6<(1(%+,"5<*6...7(%@&"*99:6+15)&b"8.('?.<"+"7.6(&(*%"P2",+I".%9*<6.1.%'"<.@+<7(%@"5<*&.6)'(*%"%*<"'?."*)'6*1."*9"+%2"6<(1(%+,"5<*6...7(%@"I(,,"P."6*&(7.<.7"7.'.<1(%+'(B."*9"I?.'?.<"+"B(*,+'(*%"*9"'?(&"G*,(62"*66)<<..7b""))'))

'1"#",\$&K//%//0%1#&

>?."0(B(,"C(@?'&"D">(',."\$E"V99(6."

- g '?."0*,,.@."?+&"<.6.(B.7"+"<.5*<'"'?+'"'?.2"1+2"?+B.".45.<(.%6.7"1(&6*%7)6'i"
- g <. '+, (+'(*%" 9*<" 9(,(%@" +" 6* 1 5, +(%'" *<" 5+<'(6(5+'(%@" (%" +" 6* 1 5, +(%'" 5<*6. &&/" *<" P*'?/" (&" 5<*?(P(' .7i"
- g '?."6*)%&.,(%@"<.&*)<6.&"+B+(,+P,."+'"'?."0*,,.@."*<"(%"'?."6*11)%('2i"
- g '?+'/" I ?.%"+"6<(1." 1+2"?+B."*66)<<.7/"'?.2"?+B."'?."<(@?'"'*"<.5*<'"'?." 1+''.<"'*",+ I ".%9*<6.1.%'i"
- g '?."<(@?'"'*"&..Z"1.7(6+,"'<.+'1.%'i"
- g '?."0*,,.@.A&"(%B.&'(@+'(*%"5<*6.7)<.&i"
- g 5*'.%'(+,"(%'.<(1"1.+&)<.&"'?+'"+<."+B+(,+P,.i"
- g '?."(15*<'+%6."*9"5<.&.<B(%@".B(7.%6.i"
- g +"<.L).&'"9*<"'?."6*15,+(%+%'"'*"1...'" I ('?"'?."0(B(,"C(@?'&"D">(',."\$E"V99(6."'*"7(&6)&&" *5'(*%&"9*<"<.&5*%7(%@"'*"'?."<.5*<'i""
- g '?."<(@?'"'*"P."+66*15+%(.7"P2"+%"+7B(&*<"*9"6?*(6.i"+%7"
- g '?." I+2"'?." 0*,,.@."<.&5*%7&"'*"<.5*<'&"*9" 1 (&6*%7)6'"+%7"+"7.&6<(5'(*%"*9"5*'.%'(+,"7(&6(5,(%+<2"6*%&.L).%6.&b"

H&"5+<'"*9"'?."(%('(+,"+&&.&&1.%'/"'?."O(B(,"C(@?'&"D">(',."\$E"V99(6."I(,,))"))))))

- g +&&.&&"'?."%+')<."+%7"6(<6) 1 &'+%6.&"*9"'?."<..5*<'i""
- g +77<.&&"(1 1 .7(+'."5?2&(6+,"&+9.'2"+%7".1*'(*%+,"I.,,;P.(%@i""
- g 6* 1 1)%(6+'."%.6.&&+<2"7.'+(,&"*9"'?."<.5*<'"'*"0+15)&"J+9.'2"'*".%'.<"'?."<.5*<'"(%'*"'?." 0*,...@.A&"7+(,2"6<(1.",*@"(9"<.L)(<.7"P2"'?."0,..<2"H6'i""
- g 5<*B(7." '?." 6*15,+(%+%'" I('?" +%" .45,+%+'(*%" *9" '?." 5<*6.7)<+," *5'(*%&/" (%6,)7(%@" ; (&6(5,(%+<2"C.&*,)'(*%"+%7"H7+5'+P,."C.&*,)'(*%i""
- g 7(&6)&&" '?." 6* 15,+(%+%'A&" 5<.9.<.%6." 9*<" 1+%%.<" *9" <.&*,)'(*%" +%7" +%2" P+<<(.<&" '*" 5<*6..7(%@i""
- g 7(&6)&&"'?."5<*6.&&"9*<"9(,(%@"+"9*<1+,"6*15,+(%'i"
- g +&&.&&"9*<"+%2"5+''.<%"*9"6*%7)6'"P2"'?."<.&5*%7.%'i"+%7"
- g 7.'.<1(%."+@."*9"'?."6*15,+(%+%'i"+%7"(9"'?."6*15,+(%+%'"(&"+"1(%*<"*<"I+&"+"1(%*<"+"'!?." '(1."*9"'?."+,,.@.7" G<*?(P('.7" 0*%7)6'/" 1+Z."'?."+55<*5<(+'."%*'(9(6+'(*%&" '*" &'+'." +@.%6(.&b""

H'"'?."6*%6,)&(*%"*9"'?."(%('(+,"+&&.&&1.%'/"'?."0*,,.@."I(,,"5<*6..7"I('?"*%."*9"'?."9*,,*I(%@"*5'(*%&"""))))))

g

- $g \quad H"6*15, +(\%+\%'"\%*'(9(.\&"'?."0)(B(,"C(@?'\&"D">(',."$E"0**<7(\%+'*<"(\%"I<('(\%@"'?+'"'?.2"I*),7",(Z."'*"I('?7<+I"'?."9*<1+,"6*15,+(<math>\%'"*<"+\%2"+,...@+'(\%\&"'?.<..(\%i"))))))$
- g >?."<.&5*%7.%'"(&"%*",*%@.<".%<*,,.7"+'"*<".15,*2.7"P2"'?."0*,,.@.i"*<"
- g J5.6(9(6"6(<6) 1 & +%6. & 5<. B.%'"'?."0*,,.@."9<* 1 "@+'?.<(%@".B(7.%6."&)99(6(.%'"'*"<.+6?"+"7.'.<1 (%+'(*%"+&"'*"'?."9*<1+,"6*15,+(%'"*<"+,,.@+'(*%&"'?.<.(%b"

9"+"9*<1+,"6*15,+(%'"(&"7(&1(&&.7"P2"'?."0*,..@."

g >?."+@."+%7"<..,+'(*%&?(5"*9"'?."5+<'(.&/"(%6,)7(%@"I?.'?.<"'?."C.&5*%7.%'"(&"+%".15,*2.." *9"'?."0*,..@.i""""

g

<.5<.&.%'+'(B."'<+%&9.<"+,,"(%9*<1+'(*%"@+'?.<.7"+%7"<.,+'.7"9(%7(%@&"'*"'?."0(B(,"C(@?'&"+%7">(',." \$E"V99(6."'*"7.'.<1 (%."I?.'?.<"9)<'?.<"(%B.&'(@+'(*%"(&"%.6.&&+<2"))%7.<"'?(&"G*,(62b")

>)&(-&/-6"96LA'-+(7+6

K''6!''(9%'7)6''96<()+/+,)6''/6J'&.6

$$\begin{split} &H\%2"(\%7(B(7)+,"6+<<2(\%@"*)'''?.\&."5<*6.7)<.\&"1)\&'"P."9<..."9<*1"+\%2"+6')+,"6*\%9,(6'"*9"(\%'.<.\&'"*<"P(+\&"'?+'"I*),7"(15+6'"'?."?+\%7,(%@"*9"'?(\&"1+''.<b"J?*),7"'?."0(B(,"C(@?'\&"D"><',...$E"0**<7(\%+'*<"?+B."+"6*%9,(6'"*9"(%'.<.&'/"'?."0(B(,"C(@?'&"D"><',.."$E"0**<7(\%+'*<"(\&"'*"(11.7(+'.,2"\%*'(92"'?."G<.&(7.\%'"*9"'?."0*,...@./"I?*"I(,,"+55*(%'"+"0*,...@."+71(%(&'<+'*<"'*"&.<B."+&"H6'(%@"0(B(,"C(@?'\&"D"><',...$E"0**<7(\%+'*<"'*"&.<B."+&"H6'(%@"0(B(,"C(@?'\&"D"><',...$E"0**<7(\%+'*<"'*",...$B."+&"H6'(%@"0(B(,"C(@?'&"D"><',...$E"0**<7(\%+'*<"'*",...$B."+&"H6'(%@"0(B(,"C(@?'&"D"><',...$E"0**<7(\%+'*<"'5,...$B."+&"+6"''?."V99(6."*9"'?."G<.&(7.\%'"*<"7(&6<(1(\%+'(*\%"P2"'?."0(B(,"C(@?'&"D"><',...$E"0**<7(\%+'*</"5,...$B."+&"+6"''?."V99(6."*9"''?."G<.&(7.\%'")")") \end{split}$$

P''-'9'7&)'''(6''96./''7+,,+,6

>?.."0*,..@."I(,,"9*,,*I"'?."G<*6.&&.&"7.&6<(P.7"?.<.(%"P+<<(%@".46.5'(*%+,"6(<6)1&'+%6.&b"%"<+<."(%&'+%6.&"?*I.B.</"'?."0*,..@."1+2"P."<.L)(<.7"'*"+7+5'"*<"1*7(92"'?."G<*6.&&.&"](%6,)7(%@"'(1...(%.&"*".%&)<."5<*15'"+%7".L)('+P..."<.&*.)'(*"*9"+"<.5*<'"*

 $>?(\&"5*,(62"7.\&(@\%+'.\&"<.+\&*\%+P,2"5<*15'"'(1.9<+1.\&"9*<"?."1+c*<"\&'+@.\&"*9"'?."(\%B.\&'(@+'(*\%"+\%7"<.\&*,)'(*\%"5<*6.\&\&"]'25(6+,,2"\&.'"9*<'?"(\%"P)\&(\%.\&\&"7+2&^/"P)'"'?."0*,,.@."1+2".4'.\%7"+%2"'(1.9<+1."(\%"'?(\&"5*,(62"9*<"@**7"6+)&.b"H\%".4'.\&(*\%"1+2"P."<.L)(<.7"9*<"@**7"6+)&."'*".\&\&)<./"9*<".4+15,./"''?."(\%'.@<('2"+\%7"'?*<*)@?\&.&\"*9"'?."(\%B.&'(@+'(*\%i"'*"6*15,2"I('?"+"<.L).&\""P2",+I".\%9*<6.1.\%'i"$

=!"

* ??\$9@'>!*)!C'-%'?6'94D=!G\$-76+&'79!7#!4!SD'\$(49%\$!7#!3'&6\$!: I!L\$>+46! T4D4--<\$9&!!

H55.%7(4"H"*)',(%.&"'?."'7(&6(5,(%+<2"<.&*,)'(*%"'5<*6.7)<.&"'?."'0*,,.@."'9*,,*I&"(%"<.&*,B(%@"+,,.@+'(*%&"'?+'"+"5.<&*%"'?+&"P...%"&)Pc.6'.7"'*">(',."\$E"J.4)+,"S+<+&&1.%''"(%"B(*,+'(*%"*9"'?."'0*,,.@.A&"J.4)+,"+%7"\$%'.<5.<&*%+,"T(&6*%7)6'"G*,(62b""

23#"6%&3>&'1C%/#"F,#"31&

X5*%""?."9(,(%@"*9"+"Q*<1+,"0*15,+(%"

 $3+6?"5+<'2" \ I \ (,,"P."5<*B(7.7" \ I \ ('?"+\%"*55*<')\%('2""*"*99.<"<...B+\%" \ I \ ('\%.\&\&.\&"+\%7".B(7.\%6.b">?." \ \%B.\&'(@+'*<"I \ (,,"6*\%\&(7.<"+,,"<...B+\%"".B(7.\%6./"P*'?"(\%6),5+'*<2"+\%7".46),5+'*<2b'H,,"(\%9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*<1+'(*\%"9*))*]. \ (\%B.\&'(@+'*<" I \ (,,"\%*'"P."+,,* I \ .7" \ 7)<'(\%@"'?."?.+<'(\%@"'?."?.+<'(\%@"'(*\%9*<1+'(*\%"9*<1+'(*\%"1+\%*'"?."'?."'?."'?."'?."'?."'\%B.&'(@+'*<"1+\%"9*'?."'?."\%B.&'(@+'(*\%"$9"\%)"\%). \ I \ .B(7.\%6.\"(\%"1*). \ (\%"1*).$

LA' - + (7 + 6 * + A' + M6)

 $H'''?."6*\%6,)\&(*\%"*9"+,,"(\%'.<B(.I\&"+\%7"9+6'"@+'?.<(\%@/"+\%7"I?.\\"'?."'B(7.\%6."?+\&"P..\\"'@+'?.<.7/"'?."\\BA.\&'(@+'*<"I(,,,"5<*B(7.".+6?"5+<'2"'?."*55*<')\\('2"'*"<.B(.I"+,,"*9"'?.".B(7.\%6."?+\&"P..\\"'@+'?.<.7'"'?+'"'(\&"7(<.6',2"<.,+'.7"'*"'?."+,..@+'(*\%]\&\%')>?(\&"I(,,"(\%6,)7."P*'?"(\%6),5+'*<2"+\\7".46),5+'*<2".B(7.\%6.\\"-\\"'\B(7.\%6.\\"-\"'\B(7.\%6.\"'\B(7.\%6.\\"$

 $3+6?"5+<'2"\ 1+2"<.\&5*\%7"'*"'?."B(7.\%6."@+'?.<.7b"3+6?"5+<'2"\ I(,,,?+B."'.\%"]!N^"P)\&(\%.\&\&"7+2\&"(\%'') I?(6?"'*"<.\&5*\%7"'*"'?."B(7.\%6.b"3+6?"1+2"5<*B(7."+"<.\&5*\%\&."(\%''\ I<('(\%@"'*"'?."$\%B.\&'(@+'*<b">>?."$\%B.\&'(@+'*<b">>?."$%B.\&'(@+'*<b">>?."$%B.&'(@+'**\B).&''?."$%B.&'(@+'**\B).&''?."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+''*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&'(@+'*\B).&''$??."$%B.&''$?."$%B.&''$??."$%B.&''$%B.&''$

 $\text{'*"<.\,,.} \\ B+\%'''(\%9*<1+'(*\%/''?."\$\%B.\&'(@+'*<"I(,,".45,+(\%"'*"?."5+<'2"I?*"5<*5*\&.7"'?."L).\&'(*\%\&"+\%2"7.6(\&(*\%"'*".46,)7."+"L).\&'(*\%"+\&"\%*'"<.,.B+\%'b"}$

 $\begin{aligned} & H\%2".B(7.\%6.""*P."6*\%\&(7.<.7"P2"'?."S.+<(\%@"V99(6.<"1)\&"P."5<*B(7.7""*"'?."\%B.\&'(@+'*<"7)<(\%@"'?."9+6':@+'?.<(\%@"5*<'(*\%"*9"'?."(\%B.\&'(@+'(*\%b"\$\9*<1+'(*\%"'?+'"I+\%"\$'*'"5<*B(7.7"'*"'?."\$\%B.\&'(@+'*<"I(,,"\%*'"P."+,,*I.7"7)<(\%@"'?."?.+<(\%@"('&.,9/")\%,.&&"("6+\"P."6,.+<,2"7.1*\%&'<+'.7"'?+'"&\6?"(\%9*<1+'(*\%"I+\%"\$'"'<.+\&*\+P.2"Z\%*I\%"'*/"*<"+B+(,+P.."'*/"'?."5+<'(.\&"+'"'?."'(1."*9"'?.") \left) \end{aligned}$

- %,."1F&

>?... 6*15, +(%+%')'' < .&5*%7.%''' +%7" '?... S. +<(%@" V99(6.<" +,," ?+B." '?... <(@?'" '*" 6+,," I ('%.&&.&b" d ('%.&&.&" 1)&'"?+B."(%9*<1+'(*%"<.,.B+%'"'*"'?..."(%6(7.%')" 8*"5+<'2" I (,,"P."5.<1 (''.7"'*"6+,,"+&"+" I ('%.&&" +%2*%." I ?*" I +&" %*'" (%'.&B(. I .7" P2" '?... \$%B.&'(@+'*<" +&" 5+<'" *9" '?... \$G<.,(1 (%+<2" %B.&'(@+'*<" +&" 5+<'" *9" '?... *G<.,(1 (%+<2" %B.&'(@+'*<" +&" 5+<'" *9" '?... *G<.,(1 (%+<2" %B.&'(@+'*<" +&" 5+<'" *9" '?... *G<.,(1 (%+<2" %B.&''?+2*" '?... *G<.,(2 %''** '*" '?... *G<.,(1 (%+<2" %B.&''?+2*" '?... *G<.,(2 %''** '*" '?... *G<.,(1 (%+<2" %B.)) '?... *G<.,(1 (%+<2" %B.&''?+2*" '?... *G<.,(2 %''** '*" '?... *G<.,(1 (%+<2" %B.)) '?... *G<.,(1 (%+<2" %B.&''?+2*" '?... *G<.,(2 %''** '*" '?... *G<.,(1 (%+<2" %B.&''?+2*" '?... *G<.,(2 %''** '*" '?... *G<.,(3 %''**

 $S. + < (\%@"V99(6. < "S. + < (\%@"V99(6. < "I(,,"7.'. < 1(\%."'?." < .,.B + \%6."*9". + 6?"L).\&'(*\%" + \%7".45, + (\%"I?2" + \%2"L).\&'(*\%"(\&"7...1.7"(<<.,.B + \%'b"3 + 6?"5 + < '2"I(,,"? + B."'?."*55*<')\%('2"'*"1 + Z." + "6, *&(\%@"\&' + '.1.\%'b">?(&"&' + '.1.\%'b")>?(&"&' + '.1.\%'"(&"'*"P."1 + 7."P2"'?."5 + < '2"7(<.6',2/" + \%7"\%*'"P2"'?.(<"+7B(&*<b">>?(&"6,*&(%@"&' + '.1.\%'"(&"'*"P."1 + 7."P2"'?."55*<')\%('2"'*" + 77<.&\delta""?.";.6(&(*%))$

 $(\&"<.\&5*\%\&(P,."9*<"*\%."*<"1*<."B(*,+'(*\%\&"*9"'?."0*,,.@.\&"+\%'(7(\&6<(1(\%+'(*\%"5*,(6(.\&/"'?."0*,,.@."I(,,"(\&\&)."&+\%6'(*%\&"6*11.%\&)<+'."I('?"'?."B(*,+'(*\%]\&'/"(\%"+66*<7+\%6."I('?""\bar{H55.\%7(4"3})"H\%2"\&+\%6'(*%\&"(\&\&).7"I(,,"P."(\%6,)7.7"(\%"'?."S.+<(\%@"V99(6.<A\&"I<(''.\%"7.'.<1(\%+'(*\%b"))"+(*\%b"))).$

K<<\%,\\$/\&

!





 $>?."\$\%B.\&'(@+'*<"I(,,"5<.5+<."+"I<(''.\%"<.5*<''\&)\ 1\ 1+<(e(\%@"+,,"<.,.B+\%'''.B(7.\%6."@+'?.<.7"+\%7"+,,"(\%B.\&'(@+'(B."\&'.5\&"'+Z.\%"'*7+'.b">?."5+<'(.\&"I(,,"?+B."'.\%"]!N^"P)\&(\%.\&\&"7+2\&"'*"(\%&5.6'"+\%7"<.B(.I"'?.".B(7.\%6."+\%7"&)P1('"+"I<(''.\%"<.&5*%&."(\%"I<('(\%@"'*"'?."\$\B.&'(@+'*<\">?."\$\B.&'(@+'*<\">?."\0)B(B,\"C(@?'\&"D"><(',."\$E"O**<7(\%+'*<"I(,,"?+B."'?."\$\B',)1."+\7"\%+')<."*9"'?.".B(7.\%6.b"")$

 $\begin{array}{l} d ?.\%"7..1 .7"+55<*5<(+'."P2"'?."\$\%B.\&'(@+'*</"'?."\$\%B.\&'(@+'*<"I(,,"6*\%7)6'"+\%2"+77('(*\%+,"9+6': @+'?.<(\%@"+\&"1+2"P."\%.6.\&\&+<2b"\$9"\%.I/"<.,.B+\%'".B(7.\%6."I+\&"\&)P1(''.7"+\&"5+<'"*9".B(7.\%6."<.B(.I/" *<'(\&"@+'?.<.7"7)<(\%@"'?(\&"\&.6*\%7"9+6': @+'?.<(\\@"5.<(*7/"'?."\%.I"<.,.B+\%'".B(7.\%6."I(,,"P."1+7." +B+(,+P,."9*<"<.B(.I"P2"'?."5+<'(.\&"+\%7"'?.(<"+7B(&*<\&b">>?."5+<'(.\&"I(,,"?+B."9(B."]F^\"P) &(\%.\&\%"7+2\%" '*"5<*B(7."+"<.&5*\&."'*")?."\%.I,2"@+'?.<.7".B(7.\%6.b"8*"\%.I".B(7.\%6."I(,,"P."+66.5'.7"+&"5+<'"*9" +\%2"<.&5*\&./".46.5"'"?+""?."\%B.&'(@+'*<"I(,,"?+B.")?."7(&6<.'(*\%"'*"+66.5"<.,.B+\%".B(7.\%6."'?+""I(\%"**").B(7.\%6.").B(*)&.2"7(&6*B.<+P,."I('?"'?." -1.\%"**").4.<6(\&."*9"<.+\&*\+P,."7((@.\%6.b"").B(*).\%").$

>?."\$%B.&'(@+'*<" I (,,"6*%&(7.<"'?."5+<'(.&A" I <(''.%"<.&5*%&.&"P.9*<."9(%+,(e(%@"'?."(%B.&'(@+'(*%" <.5*<'b""

>?."\$%B.&'(@+'*<"I(,,"&.<B."+&"'?."; .6(&(*%:1+Z.<b">>?."; .6(&(*%:1+Z.<"I(,,"

g

F="

??\$9@'>!8)!@4?&456\$!G\$-76+&'79!JD7%\$@+D\$-!

 $>?.."0(B(,"C(@?'\&"D">(',.."\$E"0**<7(\%+'*<"<.B(.I\&"'?.."1+''.<"'*"?..".4'.\%'"\%.6.\&\&+<2"'*"6*\%9(<1"'?+'"('"\&"*9"'?.."'25.."'?+'"I*),7"P.."+55<*5<(+'.."9*<"+\%"+7+5'+P,.."<.&*,)'(*\%"5<*6.\&\&"+\%7"'?+'")\&.."*9"+\%"+7+5'+P,.."<.&*,)'(*\%"5<*6.\&\&"+\%7"'?+'")\&.."*9"+\%"+7+5'+P,.."<.&*,)'(*\%"5<*6.\&\&"+\%7"'?+'")&.."*9"+\%"+7+5'+P,.."<.&*,)'(*\%"*5'(*\%&"+B+(,+P,..")\%7.<"'?(\&"G*,(62"<.6*@\(e.\)"")$

- g >?."@*+,"*9"+7+5'+P,."<.&*,)'(*%"(&"'*"+77<.&&"'?."G<*?(P('.7"0*%7)6'/"(7.%'(92"I+2&"'?+'" (%7(B(7)+,&"+%70*<"'?."6*11)%('2"?+B."P..%"?+<1.7/"+%7"7.B.,*5"+"<.&*,)'(*%"+@<..1.%'" '*"+77<.&&"'?."?+<1"+%7"5<.B.%'"9)')<."G<*?(P('.7"0*%7)6'i"

g

g G+<'(6(5+%'&" (%" +7+5'+P,." <.&*,)'(*%" 5<*6.&&.&" 1)&'" P." 5<*'.6'.7" 9<*1" &.6*%7+<2" B(6'(1(e+'(*%" +%7" *'?.<" 5*'.%'(+," ?+<1&/" (%6,)7(%@" '?." 5<.&&)<." '*" 5<*6..7" '?<*)@?" +7+5'+P,."<.&*,)'(*%"(%&'.+7"*9"9*<1+,"<.&*,)'(*%b"

K7,<#,:\$%&;%/3\$+#"31&A<#"31/&

K7,<#,:\$\%;\%0\%7\\%\&3.&\1\\%.C\%1\\\"31\&>3.&\\9\\&B3\\\\$\\F\\&B300+1\\\\@&

\$%" + 77('(*%" '*" (%' .<B .%'(*%&" +55, (.7" '*" '? ." < .&5*%7 .%'/" +%7" < .@+<7, .&&"*9" I?.'? .<" '? ." 0*,, .@ ." 5) < &) .&" +"; (&6(5, (%+<2" C .&*,)'(*%" *<" '+Z .&" *'? .<" 9*<1 +, "7(&6(5, (%+<2" +6'(*%/" '? ." 0)B(," C(@?'&" D" >(', ."\$E"0**<7(%+'*<" 1+2"9(%7"('"? .,59),"*<"% .6 .&&+<2"'*" < .L) .&'"*<" < .L) (< ."'? ." < .&5*%7 .%'"*<"*'? .<&" '*") %7 .<'+Z ." &5 .6(9(6"&' .5&" 7 .&(@% .7" '*" .,(1 (%+' ."'? ." 1 (&6*%7)6'/" 5< .B .%'" ('&" < .6) << .%6 ./" +%70*<" < .1 .72"('&" .99 .6'&b"34+15, .&"(%6,)7 ./"P) '"+< ."%*'",(1 (' .7"'*/"'? ."9*,,* I (%@"")

- g C.L).&'(%@"*<"<.L)(<(%@"+"0*,,.@.".%'('2"'*"5<*B(7."'<+(%(%@"9*<"('&"&'+99"*<"1.1 P.<&i")))))
- g C.L).&'(%@"*<"<.L)(<(%@"'?."<.&5*%7.%'"'*"<.6.(B."'<+(%(%@i"
- g 0*%'(%)(%@"+%2"*9"'?."5<*'.6'(B."+%7"&)55*<'(B."1.+&)<.&"5<.B(*)&.2".&'+P.(&?.7i")
- g \$7.%'(92(%@"'?."%..7"9*<"+%2"+77('(*%+,"*<"*%@*(%@"1.+&)<.&/"&)55*<'&"+%7"<.1.7(.&i"*<"
- $g \qquad C \,.\, B(\&(\%@"0*,,..@."5*,(6(\,.\&/"5<+6'(6\,.\&/"*<"\&.<\!B(6\,.\&b"$

*??\$9@'>!C)!L&+@\$9&!L49%&'79'9,!JD7%\$@+D\$-!

\$9"+"<.5*<'"5<*6..7&"'?<*)@?"; (&6(5,(%+<2"C.&*,)'(*%"+%7"'?.."<.&5*%7.%'"(&"9*)%7"<.&5*%&(P,.."9*<" *%.."*<"1*<."B(*,+'(*%&"*9"'?.."0*,..@.A&"+%'(7(&6<(1(%+'(*%"5*,(6(.&/"'?.."0*,..@."I(,,"(&&)..."&+%6'(*%&"

 $\begin{array}{l} H\%2"*\%."*<"1*<."*9"'?."\&+\%6'(*\%\&",(\&'.7"?.<."1+2"P."(15*\&.7"*\%"+"<.\&5*\%7.\%"I?*"(\&"9*)\%7" \\ <.\&5*\%\&(P,."9*<"+"B(*,+'(*\%"*9"'?."0*,,.@.A\&"J.4)+,"+\%7"\%'.<5.<&*\%+,"T(\&6*\%7)6'"G*,(62b"J+\%6'(*%\&"+<."+\&\&.\&\&.7"(\%"<.&5*\%\&."'*"'?."&5.6(9(6"B(*,+'(*\%]\&^"+\%7"+\%2"5<(*<"7(\&6(5,(\%."?(\&'*<2"*9"'?."<..&5*\%7.\%'b"J+\%6'(*\%\&"+<.".99.6'(B."(11.7(+'.,2b"\$9"'?."<.&5*\%7.\%'"+55.+,&"'?."'9(\%7(\%@\&"6*\%'+(\%.7"(\%"'?."\%2"\$9"'?."<.&5*\%7.\%'"+55.+,b")>?."&+\%6'(*\%\&"1+2"P.",(9'.7"*\%,2"(9)"+&"+<..&),'"*9"'?."\$0.\%''\$1."*9"'?."+55.+,\"'?."(\%"'?."\$0.\%''\$0.\%'\$0.\%''\$0.\%''\$0.\%'\$0.\%''\$0.\%'\$0.\%''\$0.\%'\$0.\%'\$0.\%''\$0.\%'\$0.\%'\$0.\%''\$0.\%'\$0.\%'\$0.\%'\$0.\%'\$0.\%'\$0.\%'\$0.\%'\$0.\%'\$0.\%''\$0.\%\$0.\%'\$0.\%'\$0.\%\$0.\%\$0.\%'\$0.\%'\$0.\%'\$0.\%\$$

U''/#&3>&83//":%&),16#"31/&

 $\frac{!\ \&\#\$5,6!\ ''\#\#5(\ ')0N}{\mathsf{G}<^*?(P('.7"\ 0*\%7)6'/"'?."\ 0(B(,"C(@?'\&"D"><'."*E"\ 0***<7(\%+'*<$

 $('\&"'<+\%\&6<(5'\&"+\%7"7.@<\ldots\&"*<"'*"7.\%2"+"\&')7.\%'"5+<'(6(5+'(*\%"(\%"@<+7)+'(*\%"6.<.1*\%(.\&"+\%7"5<(B(,.@.7".B.%'\&b"$

*??\$9@'>!'')!P4%+6&=!7D!L&4##! R\$<5\$D!L49%&'79'9,!JD7%\$@+D\$-!

- $\begin{array}{l} '\cdot) \cdot "'? \cdot "9(\%7(\%@"+\&"'*" \ I \ ? \cdot '? \cdot <"'? \cdot "+, , @ \cdot .7"6*\%7) 6'"B(*,+' \cdot .7"'? \cdot " \ J \cdot .4) +, "+\%7"\$\%' \cdot .5 \cdot .& *\% +, " \\ T(\&6*\%7) 6'"G*, (62b">? \cdot "5+<'(\cdot \&" \ I (,, "?+B \cdot "'? \cdot "*55*<') \%('2"'*"\&) P 1 ('"+\%"$ 1 5+6'"J'+' \cdot 1 \cdot .\%'"'*" \\ '? \cdot "S \cdot +<(\%@" \ 0*1 \ 1 ('' \cdot . '' +\%7"'? \cdot "S \cdot .+<(\%@" \ 0*1 \ 1 ('' \cdot . " \ I (,, "< \cdot .B(\cdot I "'? \cdot "' 5+<'(\cdot \& I "$ 15+6'" \ J'+' \cdot 1 \cdot .\%'\&''+\%7" +, "*'? \cdot .<" \ 1+' \cdot .<(+,\&" (\%"'? \cdot "6+\& \cdot "]< \cdot .7+6' \cdot .7" +\&" \% \cdot 6 \cdot \&\& +<2" +\%7" +55<*5<(+' \cdot .^/" (\%6,) 7(\%@"'? \cdot "S \cdot .+<(\%@"*<"$\%B \cdot \&'(@+'(*\%"V)'6*1 \cdot "+\%7"+''+6? \cdot .7"+55 \cdot .\%7(6 \cdot \&''(\%"+\&\& \cdot \&\&(\%@"'? \cdot "+55<*5<(+' \cdot ."& +\%6'(*\%"")") \\ \end{array}$
- >?."S. +<(%@"0*11(''..&"<.B(. I"(&"7*6) 1.%'+<2"*%,2"+%7"%*"?.+<(%@"(&"?.,7b"Q*,,* I(%@"&'+%7+<7"5<+6'(6./"'?."0(B(,"C(@?'&"D">(',."\$E"0**<7(%+'*<"I(,,"P."+B+(,+P,."'?<*)@?*)'"7.,(P.<+'(*%&"'*"+77<.&&"L).&'(*%&"+P*)'"'?."J.4)+,"+%7"\$%'.<5.<&*%+," T(&6*%7)6'"G*,(62"+%7"<..,+'.7"5<*6.7)<.&b"H%2"7.6(&(*%"'*"I+<%/"<.5<(1+%7/"*<"7(&1(&&"+9+6),'2"1.1P.<"<.L)(<.&"+"I*:'?(<7&"1+c*<('2"*9"'?."1.1P.<&"6*%7)6'(%@"'?."?."+<(%@/"'?."B*'."(%".+6?"(%&'+%6."'*"P+,,*'b""

E77''##''-&)'''(,6&(-6K''(4F',7'\$%'(&/086E-#'(',)/&)'A+6P+&,5/+,6)

??\$9@'>!P)!??\$46!JD7%\$@+D\$-!

 $\begin{array}{l} H55.+,\&^**9^*?.+<(\%@^**<^*(\%B.\&^!(@+'(B.^**)'6*1.\&^*1+2"P.^9(,.7"P2".('?.<^*5+<'2b"H55.+,\&^*1)\&'"P.^\&.\%'" \\ -'*"'?."O(B(,^*C(@?'\&^*D"><',.^*\$E"O**<7(\%+'*<^*I('?(\%"9(B.^*]F^*P)\&(\%.\&\&^*7+2\&^**9"<.6.(5"*9"'?."Q(\%+,^*C.5*<'b^*d?.\%'+\%"+55.+,"(\&"9(,.7/"'?."*'?.<^*5+<'2"I(,,^*P.^**'(9(.7/"(\%"I<('(\%@/"+\%7"'?.*"?+B.^9(B.^"]F^*"P)\&(\%.\&\&^*7+2\&^*"**'.\&5*\%7"'*"'?."+55.+,b"H\%2"5+<'2A\&^*7.6(\&(*\%"\%*'"'**\&)P1('"+"<.5,2"'*"+\%"+55.+,"(\&"\%*'".B(7.\%6."'?+"'"?."***:+55.+,(\%@"5+<'2"+@<..7"I('?"'?."+55.+,b") \\ \end{array}$

- g G<*6.7)<+,"(<<.@),+<('2"'?+'"+99.6'.7"'?."*)'6*1."*9"'?."1+''.<i"
- g 8. I".B(7.%6."'?+'" I+&"%*'"<.+&*%+P,2"+B+(,+P,."+'"'?."'(1."'?."7.'.<1(%+'(*%"<.@+<7(%@" <.&5*%&(P(,('2"*<"7(& 1 (&&+," I+&" 1+7./"'?+'"6*),7"+99.6"''?."*)'6*1."*9"'?." 1+''.<i"+%70*<"
- g >?." 0(B(," C(@?'&" D" >(',." \$E" 0**<7(%+'*</" \$%B.&'(@+'*<]&^/" *<"; .6(&(*%: 1 +Z.<]&^" ?+7" +" 6*%9,(6'" *9" (%'.<.&'" *<" P(+&" 9*<" *<" +@+(%&'" 6* 1 5,+(%+%'&" *<" <.&5*%7.%'&" @.%.<+,,2" *<" '?." (%7(B(7)+,"6* 1 5,+(%+%'"*<" <.&5*%7.%'"'?+'"+99.6'.7"'?."*) '6* 1 ."*9"'?." 1 +''.<b"

>?.."0(B(,"C(@?'&"D">(',.."\$E"0**<7(%+'*<"I(,,"+55*(%'"+"'<+(%.7"H55.+,&"V99(6.<"+%7"I(,,"%*'(92"'?."5+<'(.&"*9"'?."+55*(%'"+"'>+55*(%'"+"'>+6.."V99(6.<"+%7"I(,,"%*'(92"'?."5+<'(.&"*9"'?."+55*(%'"+55*(%))))))))))))))))

>?."<*,.."*9"'?."H55.+,"V99(6.<"(&",(1 ('.7b"H55.+,&"+<."%*'"(%'.%7.7"'*"P."+"9),,"<.?.+<(%@"*9"'?."6*15,+(%'"+%7"+<."6*%9(%.7"'*"+"<.B(. I "*9"'?."H55.+,"C.6*<7"9*<"'?."@<*)%7&"&'+'.7"+P*B.b">?."5+<'2"&)P1(''(%@"'?."+55.+,"6+<<(.&"'?."P)<7.%"*9"5<***9"'*"7.1*%&'<+'."'?+'".('?.<"'?."5<*6.7)<+,"(<..@),+<('2/"'?."5<*5*&.7"%.I".B(7.%6./"*<"'?."+,..@.7"P(+&"+99.6'.7"'?."**)'6*1."*9"'?."1+''.</"*<"'?+'"'?."7.6(&(*%"*9"'?.";.6(&(*%:1+Z.<"I+&"+<P('<+<2"*<"6+5<(6(*)&b">?."H55.+,"V99(6.<"I+2"?."?."+55.+,"V99(6.<"I+2"?."?."+55.+,"V99(6.<"I+2"?."?."+55.+,"V99(6.<"I+2"?."?."?."+55.+,"V99(6.<"I+2"?."?."?."+55.+,"V99(6.<"I+2"?."?."?."?."+55.+,"V99(6.<"I-2"?."?."?."?."+55.+,"V99(6.<"I-2"?."?."].

- g C.')<%"'?."6+&."'*"'?."*<(@(%+,";.6(&(*%:1+Z.<"9*<"<.6*%&(7.<+'(*%i"*<"
- g H55*(%'"+%"+,'.<%+'."; .6(&(*%:1+Z.<"'*"<.B(.I"'?."6+&.b"

 $>?."5+<'(.\&"I(,,"@.\%.<+,,2"P."\%*'(9(.7"(\%"I<('(\%@"*9"'?."*)'6*1."*9"'?."+55.+,"I('?(\%"'.\%"]!N^"P)\&(\%.\&\&"7+2\&"*9"<.6.(5""*9"%*%:+55.+,(%@"5+<'2A&"<.&5*%&."&'+'.1.%'b">?."H55.+,"V99(6.<A&"7.6(&(*\%"(\&"9(\%+,"+\%7"(\&"\%*'"\&)Pc.6'"'*"+55.+,b")"))))$